



#### 5.4.5 Flooding / Flash Flooding

##### History

Arizona has experienced 43 flooding incidents of sufficient magnitude to prompt Presidential or Gubernatorial disaster declarations. In addition, there were 63 undeclared significant flood events. The combined flood total of 106 declared flood and undeclared events are reported to have killed 35 persons and injured 250, by far the most of any hazard in Arizona. No part of the State is free from the threat of flooding, as shown in following map. A close correlation is evident between the locations of significant floods and urbanized areas of the State.

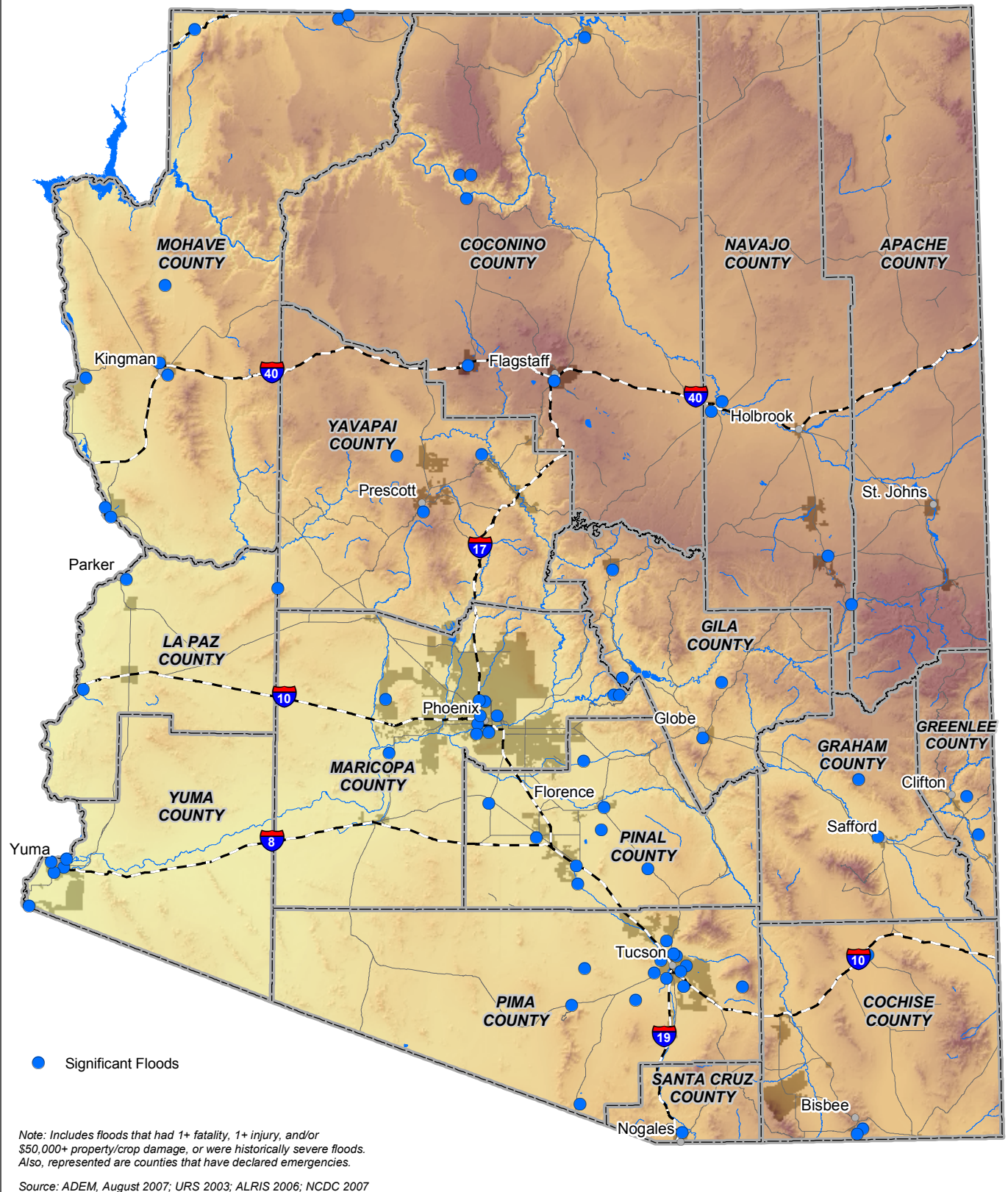
Flooding is clearly a major hazard in Arizona, where the following three seasonal atmospheric conditions tend to trigger flooding events:

- **Tropical Storm Remnants:** The worst flooding tends to occur when the remnants of a tropical storm enter the State. These events occur infrequently (i.e. every ten ears or so), mostly in the early autumn, but when they do occur the storms bring intense precipitation over large regions causing severe flooding
- **Winter Rains:** Winter brings the threat of low intensity; but long duration rains covering large areas that cause extensive flooding and erosion, particularly when combined with snowmelt.
- **Summer Monsoons:** A third atmospheric condition that brings flooding to Arizona is the annual summer monsoon. In mid to late summer the monsoon winds bring humid subtropical air into the State. Solar heating triggers afternoon thunderstorms that can be devastating. As a result of too much rain, in too small an area, in too short a time, flash flooding may result.

We have been subject to multiple examples of each of the above flood types as illustrated below:

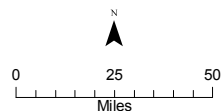
- Summer 1990, some of the worst and most extensive flooding experienced, due primarily to a series of flash flooding events. Between July 8-24, 1990, there was a series of severe thunderstorms caused by an unusually strong monsoon season that exceeded annual and individual storm event average, resulting in heavy rain, high winds, flash flooding and damage to Gila, Mohave, Pima and Yavapai Counties. On July 27, 1990, the Governor declared a state of emergency. Additional storms damaged parts of Pinal and Graham Counties between August 12-21. From August 30 to September 5, 1990 a final series of storms impacted parts of Coconino, Maricopa, and Yavapai Counties and the Havasupai and Hualapai Indian Reservations. Sky Harbor International Airport in Phoenix reported over seven inches of rain by the end of the monsoon season, more than two inches above average. Other reporting stations experienced even greater precipitation amounts, sometimes falling in extreme bursts. These storms led to the death of three persons, as well as extensive reports of flash flood and wind damages. Damages to public facilities alone reached nearly \$6.6 million, not including those on Arizona Indian Reservations (FEMA, January 1992).
- January & February 1993, winter rain flooding damage occurred from winter storms associated with the El Nino phenomenon. These storms flooded watersheds throughout Arizona by dumping excessive rainfall amounts that saturated soils and increased runoff. Warm temperature snowmelt exacerbated the situation over large areas. Erosion caused tremendous damage and some communities along normally dry washes were devastated. Stream flow velocities and runoff volumes exceeded historic highs. Many flood prevention channels and retention reservoirs were filled to capacity, so water was diverted to the emergency spillways or the reservoirs were breached, causing extensive damage in some cases. Ultimately, the President declared a major federal disaster. Damages were widespread and significant, impacting over 100 communities. Total public and private damages exceeded \$400 million, and eight deaths and 112 injuries were reported to the Red Cross (FEMA, April 1, 1993; ADEM, March, 1998).

# State of Arizona



## Legend

- Major City
- Interstate
- Highway
- Major Streams
- ▭ County
- Lakes
- Cities



August 2007



## State of Arizona Multi-Hazard Mitigation Plan

### Map 23 Significant Floods 1975 thru Present





- August 12, 1997, twelve hikers were caught in a deadly flash flood as a 10-30 foot wall of water rushed through Lower Antelope Canyon. The hikers did not recognize the flood danger until it was too late, probably because the storm that caused the flood occurred several miles away. Only one-month later two hikers were killed and one injured by a flash flood as they were crossing Phantom Creek in the Grand Canyon National Park. Again, the hikers were caught off guard, probably because the storm that caused the flood occurred several miles north of the flash flood site (National Weather Service Flagstaff).
- It is also important to note that in addition to affecting people, floods may severely affect livestock and pets. Such events may require the emergency watering/feeding, shelter, evacuation, and event burying of animals, such as during the floods in Maricopa County in the 1980's and La Paz County in 2001 (Lanman, May 27, 2003).

A measure of the seriousness and location of floods in Arizona is the number of National Flood Insurance Program (NFIP) losses and payments. During the period 1978-2007, there were 3,648 losses and approximately \$28 million in payments, Maricopa County has the most losses and Pima County has the second highest. Greenlee County has only 146 losses, but the fourth highest payments at over \$2.3 million.

In 1968, Congress created the NFIP in response to the rising cost of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The Mitigation Division, a component of FEMA manages the NFIP, and oversees the floodplain management and mapping components of the Program.

More than 21,000 communities across the United States participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities (AZ Dept., of Water Resources, 2007).

National Flood Insurance Program (NFIP) Loss Statistics 1978-2/2007		
County	Losses	Payments
Apache	5	\$ 5,742
Cochise	56	\$ 211,334
Coconino	140	\$ 1,745,485
Gila	52	\$ 1,361,635
Graham	31	\$ 166,638
Greenlee	146	\$ 2,353,894
La Paz	70	\$ 760,812
Maricopa	1,584	\$ 8,083,393
Mohave	123	\$ 773,318
Navajo	70	\$ 658,245
Pima	356	\$ 3,292,303
Pinal	81	\$ 1,338,930
Santa Cruz	146	\$ 1,072,469
Yavapai	302	\$ 2,885,418
Yuma	144	\$ 1,151,313
<b>Total</b>	<b>3,306</b>	<b>\$ 25,860,929</b>
Source: NFIP Bureau & Statistical Agent, 2007.		



Currently, 36,907 eligible homeowners in Arizona have taken advantage of the NFIP program. It should be noted that only a minority of property owners in floodplains actually purchase flood insurance, therefore the actual financial loss experienced locally is probably much greater than indicated here.

<b>National Flood Insurance Program (NFIP) Policy Holders by County as of 2/28/2007</b>	
<b>County</b>	<b>Policies In Force</b>
Apache	47
Cochise	1,279
Coconino	735
Gila	471
Graham	177
Greenlee	73
La Paz	256
Maricopa	18,604
Mohave	5,943
Navajo	317
Pima	5,315
Pinal	826
Santa Cruz	505
Yavapai	1,618
Yuma	741
<b>Total</b>	<b>36,907</b>

The NFIP Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from community actions meeting three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance. The resulting premium discounts are based on the CRS Class a community receives earned based on carrying out any or all of the 18 creditable activities that save lives and reduce property damage. The Class range is 1-10, one being the best rating. Class 1 communities would receive a 45% premium discount and the discount decreases 5% with each class, with no discount for Class 10. The Arizona CRS ratings are as follows:

<b>Arizona CRS Ratings as of May 2007</b>					
<b>Community</b>	<b>Class</b>	<b>Community</b>	<b>Class</b>	<b>Community</b>	<b>Class</b>
Camp Verde, Town	8	Glendale, City	8	Santa Cruz County	7
Casa Grande, City	8	Holbrook, City	8	Scottsdale, City	7
Chandler, City	7	Maricopa County	5	Sedona, City	9
Chino Valley, Town	8	Mohave County	8	Show Low, City	9
Clarkdale, Town	8	Navajo County	9	Tempe, City	8
Cochise County	9	Phoenix, City	6	Tucson, City	7
Coconino County	8	Pima County	5	Wickenburg, City	9
Flagstaff, City	8	Prescott, City	8	Yavapai County	8
Gilbert, Town	8				
Source: ADWR, August 2007.					



According to the FEMA website, the majority (40%) of the participating communities are in Class 8, with only one community in Classes 1, 2, 3 and 4. Currently, eight of our 15 counties participate and nearly 80% of our counties/communities are in Class 8 or below with only 5 communities in Class 9.

ADWR's floodplain management program is funded primarily by FEMA's Community Assistance Program (CAP). One of the main objectives of CAP is to assure that jurisdictions adopt and enforce their local floodplain management ordinance in accordance with regulations of the National Flood Insurance Program (NFIP) and the Arizona Revised Statutes (ARS). Through this program, Community Assistance Visits (CAV), visits are made to the 99 NFIP participating communities in Arizona. It is the goal of ADWR to visit 20% of the communities each year to provide updates on state and federal floodplain management program changes, provide technical and programmatic assistance and verify that development in floodprone areas is compliant with local floodplain management regulations.

According to FEMA records, there were 238 identified RL properties in Arizona, with a total of nearly \$7 million in associated total payments (building and contents value). Maricopa County clearly dominates the State and Yavapai County is the next largest, with 20 properties and over \$1 million in total payments. The list of RL properties was also reviewed to determine the status of mitigation of those properties. Roughly 33% of the total properties have already been mitigated. We have determined there are three properties in Arizona that qualify as Severe RL (SRL). We have utilized the NextGen website to access more information on RL statistics, however, there was little or no data available. As we continue mitigation efforts, we intend to re-visit this site and with the hopes it will be a useful tool for us. We intend to review the properties again when the newly created SRL Program regulations and implementation guidance are released. We will take an active approach in promoting mitigation activities for the non-mitigated RL properties in Arizona.

Flood Repetitive Losses (RL) as of 5/31/2007			
County	No. of Properties	Losses	Payments
Maricopa	163	359	\$ 4,321,146.03
Yavapai	20	55	\$ 1,041,324.51
Coconino	11	27	\$ 393,220.60
Pima	10	9	\$ 292,660.40
Greenlee	6	12	\$ 229,546.71
Pinal	4	8	\$ 164,149.14
Mohave	6	2	\$ 48,602.19
Navajo	3	6	\$ 108,766.00
Graham	3	9	\$ 47,088.30
Santa Cruz	7	6	\$ 31,169.33
Gila	1	2	\$ 15,698.14
Apache	1	3	\$ 7,280.96
Yuma	1	2	\$ 5,525.89
La Paz	2	2	\$ 4,267.35
Cochise	0	0	\$0
Total	238	502	\$ 6,710,445.55





Repetitive Loss Properties by Mitigation Status as of 5/31/2007			
County	Properties		
	Mitigated	Non-Mitigated	Total
Maricopa	61	102	163
Yavapai	5	15	20
Coconino	0	11	11
Pima	1	9	10
Greenlee	0	6	6
Pinal	1	3	4
Mohave	0	6	6
Navajo	0	3	3
Graham	0	3	3
Santa Cruz	3	4	7
Gila	0	1	1
Apache	0	1	1
Yuma	0	1	1
La Paz	0	2	2
Cochise	0	0	0
<b>Total</b>	<b>71</b>	<b>167</b>	<b>238</b>
Source: FEMA Region IX, July 2007.			

### Map 23

Significant flooding events and nine emergency declarations occurred after the completion of the original Plan, which is represented in the map. A total of 75 significant floods occurred between 1975 and Present. These additional events were obtained through the National Climatic Data Center 2006 data:

1. August 9, 2005, Maricopa County heavy rains during the afternoon flooded highways and roads. A few business buildings and residential homes were damaged by flash flood waters. An off-duty National Weather Service employee reported that a two hour rainfall of 3.18 inches occurred prior to 17:30 MST.
2. August 23, 2005, Pima County, after over an inch of rain fell across a large portion of the Tucson Metro Area, some locations with more than two inches, several roads became flooded, closed, and impassable. In addition to all the flooded roadways, several trailer homes located in the southern portion of the Tucson Metro Area, were flooded and surrounded by rising water. Rescue teams evacuated several people from these homes. Brawley wash was out of its banks and flooding roadways causing them to be impassable.
3. August 1, 2005, La Paz County roads damaged by heavy rains.
4. August 2, 2005, Pima County two to four inches of rainfall near the Village of Sells, caused several of the washes in the area to flood. A vehicle entered into the Artesa wash, which at the time was running very high with water, and became stuck. Family members tried to get everyone out of the car but a one-year-old girl could not be rescued and was later found downstream.
5. August 14, 2005, Pima County: Road flooding in Town of Three Points caused a vehicle to become stuck in a flooded roadway, leading to a swift water rescue and the drowning of a 3 year-old little boy. Also, mud and water flooded a residential garage, and Brawley Wash flooded Mile Wide Road.



6. August 9, 2005, Maricopa County: "Heavy rains from widespread thunderstorms caused flash flood waters to over-flow washes from New River east to the Seven Springs area and Camp Creek. Rainfall runoff was higher than normal in the Cave Creek Complex area and contributed significantly to the rapid flooding. The first fatality involved a pickup truck with a horse trailer; the driver attempted to drive on a flooded road and the vehicle was swept away drowning the driver. The second fatality involved a seven year old girl who was being evacuated from a home along Camp Creek. The rescuer and the young girl attempted to cross the flooded creek on foot where the girl slipped from the grasp of the adult and was swept away and drowned.

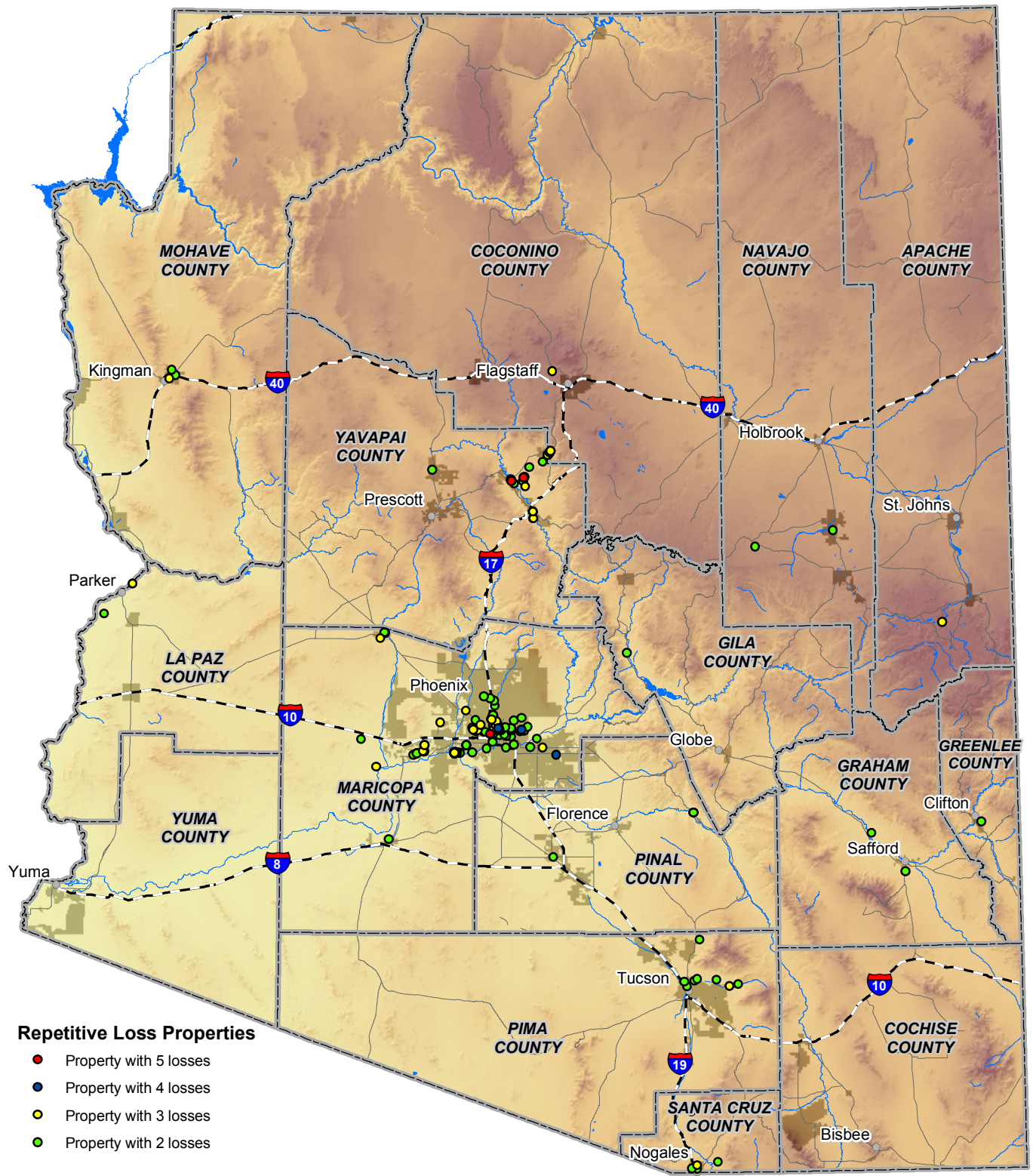
#### **Map 24**

217 of 238 properties are represented as repetitive losses due to flooding. An address file list was provided and then geo-referenced to a detailed GIS road coverage to determine the locations on the map. Many of the properties are clustered together (or not visible) which means entire neighborhoods were repetitive losses.

#### **Map 25**

The 100 Year Floodplains are a compilation of GIS shapefiles. URS original data was appended with data provided from FEMA and JE Fuller Hydrology & Geomorphology Inc. The appended information is for La Paz, Yuma, Pinal and Graham counties. 100 Year Floodplain is defined as an area of land that would be inundated by a flood having a 1% chance of occurring in any given year – also referred to as the base or 100-year flood.

# State of Arizona

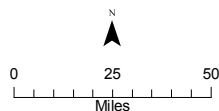


Note: 217 out of 238 properties were geocoded based on address file provided.

Source: ADEM August 2007; TeleAtlas 2007; URS 2003; ALRIS 2006

## Legend

- Major City
- County
- interstate
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- Major Streams
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August 2007



## State of Arizona Multi-Hazard Mitigation Plan

### Map 24 Repetitive Flood Loss Properties as of May 2007







## Probability and Magnitude

The most widely adopted design and regulatory standard for floods in the United States is the 1% annual chance flood and this is the standard formally adopted by FEMA. The 1% annual flood, also known as the base flood, has a 1% chance of occurring in any particular year. It is also often referred to as the "100-year flood" since its probability of occurrence suggests it should only reoccur once every 100 years (although this is not the case in practice). Experiencing a 100-year flood does not mean a similar flood cannot happen for the next 99 years; rather it reflects the probability that over a long period of time, a flood of that magnitude should only occur in 1% of all years.

Smaller floods occur more often than larger (deeper and more widespread) floods. Thus, a "10-year" flood has a greater likelihood of occurring than a "100-year" flood.

Flood Probability Terms	
Flood Recurrence Intervals	% Chance of Occurrence
10 year	10.0%
50 year	2.0%
100 year	1.0%
500 year	0.2%
Source: FEMA, August 2001.	

100-Year Floodplains In Arizona by County					
County	Total Area in Square Miles	Area Within 100-Year Floodplain			
		Total		Within Urban Boundaries	
		Sq. Mi.	%	Sq. Mi.	%
Apache	11,216	NA	NA	NA	NA
Cochise	6,215	339	5.5%	6.8	0.1%
Coconino	18,644	91	0.5%	3.8	0.0%
Gila	4,792	50	1.0%	1.7	0.0%
Graham	4,649	NA	NA	NA	NA
Greenlee	1,836	54	2.9%	0.9	0.0%
La Paz	4,517	NA	NA	NA	NA
Maricopa	9,222	519	5.6%	158.0	1.7%
Mohave	13,480	478	3.5%	11.5	0.1%
Navajo	9,952	236	2.4%	16.5	0.2%
Pima	9,184	380	4.1%	63.3	0.7%
Pinal	5,371	NA	NA	NA	NA
Santa Cruz	1,236	54	4.4%	2.6	0.2%
Yavapai	8,125	200	2.5%	23.1	0.3%
Yuma	5,523	NA	NA	NA	NA
<b>Total</b>	<b>113,962.0</b>	<b>2,401</b>	<b>32.4%</b>	<b>288.2</b>	<b>3.3%</b>
Note: Floods may still occur outside of identified flood prone areas.					
Source: FEMA, April 22, 2003; URS, October, 2003.					

Overall, the probability of floods in Arizona is very high, with the probability typically greater in the southern deserts than in the northern highlands. In the northern plateau region, runoff is funneled into defined river systems, drainage channels and canyons. Northern communities are generally unaffected by floods because they are placed above the drainage flow. Further, northern Arizona has large areas of permeable limestone and volcanic topography where rainfall rapidly percolates into the ground. By contrast, in the southern desert basins, runoff channels are not as well defined. Over 90% of our population lies in the southern basins. Urbanization and sprawl has spread development onto the washes and sediment piedmonts. Runoff from monsoon thunderstorms can quickly overtop a wash, thereby flooding adjacent areas (FEMA, January 1991; DEMA, March 1998).



Generally, southern Arizona is more susceptible to the hazards of heavy rains than are the northern and eastern due to differences in topography, vegetation, and urbanization. However, heavy rainfall occurrences accompanying tropical storms and other severe storms can quickly inundate areas statewide, causing flooding. Frequently, low-intensity, long-duration rains that cover large areas affect Arizona, particularly in the winter. When combined with snowmelt, heavy winter rains cause extensive flooding and erosion (NWS, Phoenix, May 11, 2003). The highest rainfall amounts during the monsoon season occur in the mountains and in the southeast, often causing flash flooding. The driest areas in the monsoon are along the Colorado River valley in the far west. One of the wettest locations during July-September is Greer in the White Mountains where rainfall averages 11.46 inches. By contrast, one of the driest areas during the monsoon months is Yuma, in the far southwest, where the average is only 1.21 (NWS, Phoenix, July 19, 2003).

Temperatures in the Western U.S. rose 2-5°F during the 20<sup>th</sup> century. This increase was accompanied by precipitation increases of up to 50% in some areas of the West, although some places (including Arizona) become drier and experienced more droughts. The two major climate change models, the Canadian Model and the Hadley Model, both forecast continued temperature increases in the West of 5-11°F during the 21<sup>st</sup> century, including Arizona. Both models also forecast significant increases in rainfall in much of the West, with the increase on the order of 75-100% across much of Arizona. These increases may lead to amplified water supplies, although current reservoir systems may be inadequate to control earlier spring runoff and to maintain supplies for the summer (National Assessment Synthesis Team, May 2001). Simply stated, such increases in precipitation could lead to increased flooding in Arizona and elsewhere in the West.

### **Vulnerability**

Typically, losses due to flooding would be estimated by intersecting the human and critical facility assets with the delineated 100-year floodplain limits. Loss estimates to all facilities located within the 100-year floodplain would be made using the loss estimation tables published by FEMA (FEMA Doc #386-2) as a basis. Assuming three feet or less of flooding, and using the FEMA tables, it is assumed that all specifically State identified assets located within the high hazard areas will have loss-to-exposure ratio of 0.20 (or 20%). Economic losses are unavailable at this time, but it would be assumed that high flood hazard facilities will be unproductive for 30 days.

The State has determined to use available 100 year floodplain mapping available from a variety of sources as described in Map 25. With the use of the 100 year floodplain, it is estimated that a total of 337 state owned assets (Table 5.4.5.a) have a potential of being located within a 100-year floodplain with a total replacement cost of \$240 million and an estimated loss of \$48 million. Most of the population areas are located outside of the projected floodplains, however, it is estimated that about 382,460 people or 6.5% of the total State population would be located within the high flood hazard areas (Table 5.4.5.b).

For the local risk assessment summary, Table 5.4.5.c combines asset and predominantly HAZUS information for the estimated losses as reflected in local plans. The potential total number of facilities in the high flood areas is 243,831 at a replacement cost of \$998 billion. The estimated losses for high flood areas are approximately \$1.269 billion.



Table 5.4.5.a: Summary of State-Owned asset inventory loss estimates based on Flooding					
Jurisdiction	Impacted Facilities		Estimated (x \$1,000)		
	Totals	Percentages	Replacement Cost	Structure Loss	Total Loss
<b>High Flood (100-Year Floodplain)</b>					
<b>Statewide Totals</b>	<b>337</b>	<b>100.00%</b>	<b>\$240,459</b>	<b>\$48,092</b>	<b>\$48,092</b>
Apache	4	1.19%	\$97	\$19	\$19
Cochise	47	13.95%	\$5,721	\$1,144	\$1,144
Coconino	48	14.24%	\$36,293	\$7,259	\$7,259
Gila	5	1.48%	\$779	\$156	\$156
Graham	16	4.75%	\$701	\$140	\$140
Greenlee	0	0.00%	\$0	\$0	\$0
La Paz	9	2.67%	\$3,709	\$742	\$742
Maricopa	83	24.63%	\$16,997	\$3,399	\$3,399
Mohave	14	4.15%	\$22,121	\$4,424	\$4,424
Navajo	11	3.26%	\$34,340	\$6,868	\$6,868
Pima	32	9.50%	\$43,975	\$8,795	\$8,795
Pinal	26	7.72%	\$38,856	\$7,771	\$7,771
Santa Cruz	22	6.53%	\$32,069	\$6,414	\$6,414
Yavapai	18	5.34%	\$4,498	\$900	\$900
Yuma	2	0.59%	\$302	\$60	\$60

Ranking of Vulnerable Communities - Flooding	
County	Community
Pinal	Florence
Navajo	Holbrook
Navajo	Winslow
Santa Cruz	Nogales
Coconino	Flagstaff
La Paz	Quartzsite
Yavapai	Camp Verde
Navajo	Snowflake
Cochise	Willcox
Navajo	Taylor



State Facilities Located in the Flood Hazard Area by Jurisdiction															
	AC	DOC	DOA	DES	DEQ	Fair	GF	HS	HIS	ASLD	MIL	DOT / MVD	Parks	PofE	PS
Cottonwood												4			
Douglas		25													
Flagstaff	47														
Kingman												11			3
Nogales	1			1								9			1
Phoenix						34					7				
Quartzsite															4
Superior												9			
Tempe	8														
Tucson	14														
Winslow												11			
AC: academic, DOC: Dept of Corrections, DOA: Dept of Administration, DES: Dept of Economic Security, Fair: Fair/Coliseum Facilities, GF: Game & Fish, HS: Health Svcs, HIS: historical site, ASLD: Dept of State Land, MIL: military, DOT/MVD: Dept of Transportation/Motor Vehicles, Parks: Board of Parks, PofE: Port of Entry, PS: Public Safety															



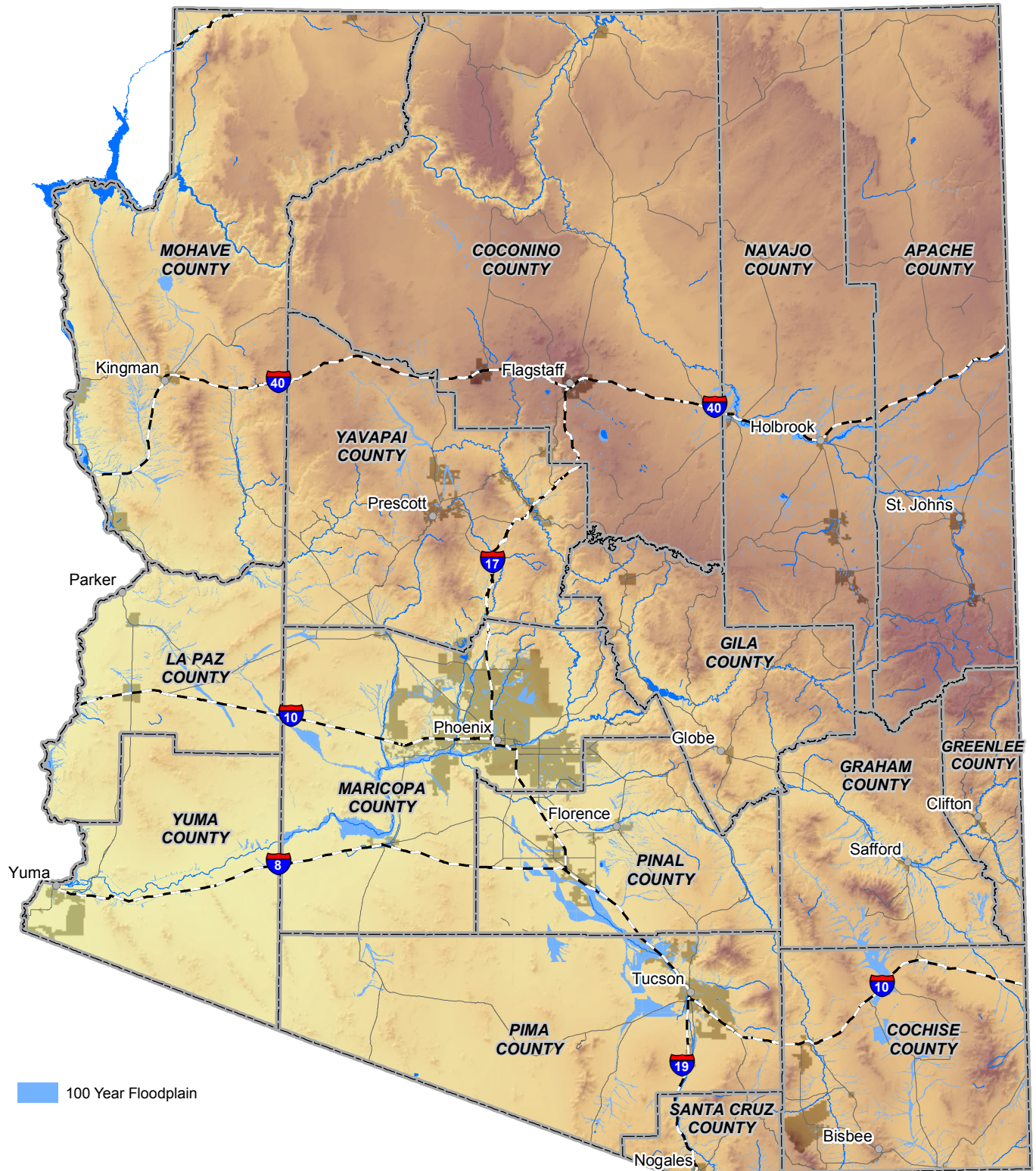


Table 5.4.5.b: County population sectors exposed to Flooding									
Jurisdiction	Population			Population of 65 yrs of age			Population under 18 yrs of age		
	Total	Exposed	Percentage Exposed	Total	Exposed	Percentage Exposed	Total	Exposed	Percentage Exposed
High Flood Hazard (100-Year Floodplain)									
<b>Statewide Totals</b>	<b>5,881,719</b>	<b>382,460</b>	<b>6.50%</b>	<b>667,760</b>	<b>40,022</b>	<b>5.99%</b>	<b>1,366,714</b>	<b>87,913</b>	<b>6.43%</b>
Apache	66,601	925	1.39%	5,741	106	1.85%	26,722	328	1.23%
Cochise	125,933	11,385	9.04%	17,359	1,569	9.04%	30,985	2,984	9.63%
Coconino	123,505	4,456	3.61%	8,150	214	2.63%	33,424	894	2.67%
Gila	51,822	2,067	3.99%	10,154	371	3.66%	12,881	557	4.33%
Graham	34,520	2,830	8.20%	3,995	392	9.81%	10,102	812	8.04%
Greenlee	7,803	419	5.37%	840	62	7.33%	2,693	130	4.82%
La Paz	19,383	625	3.22%	5,085	203	3.99%	4,156	107	2.57%
Maricopa	3,601,880	193,366	5.37%	358,963	15,965	4.45%	827,999	43,627	5.27%
Mohave	181,965	19,261	10.59%	31,702	3,272	10.32%	35,823	3,592	10.03%
Navajo	102,877	5,914	5.75%	9,757	676	6.93%	34,523	1,924	5.57%
Pima	934,680	97,422	10.42%	119,489	11,318	9.47%	207,895	22,939	11.03%
Pinal	216,255	14,644	6.77%	29,182	1,713	5.87%	45,085	2,607	5.78%
Santa Cruz	43,485	4,488	10.32%	4,104	456	11.11%	12,888	1,343	10.42%
Yavapai	192,791	12,718	6.60%	36,814	2,233	6.07%	35,402	2,512	7.09%
Yuma	178,218	11,940	6.70%	26,425	1,471	5.57%	46,136	3,557	7.71%



Table 5.4.5.c: Summary of Local Risk Assessment & Loss Estimates based on Flooding			
	Total Assets \$ (Assets +HAZUS) x \$1,000	# of Facilities Impacted (Assets + HAZUS)	Estimated Loss (Assets +HAZUS)
Flood Hazard			
<b>Statewide Total</b>	<b>\$974,508,068</b>	<b>125,031</b>	<b>\$1,047,000,000</b>
Apache	\$120,540	427	\$16,100,000
Cochise	\$2,401,934	9,811	\$81,400,000
Coconino	-----	-----	-----
Gila	\$773,946	2,649	\$73,500,000
Graham	-----	-----	-----
Greenlee	\$107,297	487	\$13,100,000
La Paz	\$450,762	3,505	\$57,800,000
Maricopa	\$21,950,551	106,190	\$2,965,000
Mohave	-----	-----	-----
Navajo	\$1,982,221	2,874	\$434,600,000
Pima	\$4,257,084	16,777	-----
Pinal	\$6,395,021	38,799	\$88,200,000
Santa Cruz	\$925,278	3,054	\$49,000,000
Yavapai	\$216,435	235	\$107,200,000
Yuma	\$956,877,550	46,413	\$126,100,000

# State of Arizona

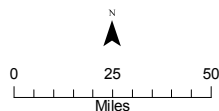


Note: Dates and sources vary for the floodplain mapping data.

Source: URS 2003; ALRIS 2006; NCDRC 2007; FEMA (varies), JEF 2007

## Legend

- Major City
- ▭ County
- interstate
- Highway
- Major Streams
- Lakes
- Cities



August 2007



## State of Arizona Multi-Hazard Mitigation Plan

### Map 25 100 Year Floodplains as of 2007

